Road Tanker Loading and Unloading

The process of loading and unloading road tankers can introduce hazards that may not have been considered, potentially resulting in loss events such as fire, explosion, spills, contamination, etc.

This Loss Prevention Standard outlines the main risks associated with road tanker loading and unloading, and provides guidance on reducing the potential for related loss events.

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Introduction

Road tankers are used to load and unload a variety of materials to silos, tanks, bullets, spheres, drums and other tankers across a range of industries and sectors. Loading/unloading operations can, however, introduce hazards and create potential for fire, explosion, environmental events, damage or injury.

This Loss Prevention Standard provides guidance on the common risks, the types of damage that can result and recommendations to help reduce the potential for such events.

Note: This document relates to road tanker loading and unloading and is focussed on property loss prevention and related risk management guidance. It is not intended to address liability exposures. The presumption is that all regulatory requirements, such as Fire Risk Assessments and compliance with local building regulations, codes, or standards, have or will be met.

Understanding the Risks

Loading and unloading of materials from tankers can present a number of risk concerns, including but not limited to:

- **Flammable Vapours**. Flammable vapours can escape and ignite upon contact with air, sparks, etc.
- **Overfilling**. Flammable liquids can come into contact with hot surfaces, e.g., vehicle parts.
- **Static**. Inadequate, missing or damaged earth bonding can result in static buildup and sparking, potentially igniting flammable vapours, liquids or dusts.
- **Spillage**. Spilt flammable or hazardous liquids or chemicals, or leaks from pipe/valve connections can ignite or contaminate other materials, land, etc.
- **Human Error.** Incorrect or accidental storage of incompatible materials can lead to fire, explosion or other harmful reactions such as vapour generation.
- **Maintenance**. Poor or inadequate maintenance regimes can result in damage to equipment during loading/unloading operations.
- **Structural Damage**. Poor driving and vehicle handling can result in damage to buildings and infrastructure.

Risk Assessment

Before implementing any risk management controls, a risk assessment of the loading and unloading operations should be completed to identify all potential loss exposures. The risk assessment should consider:

General

- The potential for loss events, e.g., fire, smoke and firefighting water contamination, damage to other equipment or other assets through impact or accidental damage, etc.
- The importance, or business impact, should site buildings, equipment and other valuable assets be damaged, lost or incur downtime.
- The financial value, or reinstatement cost of the equipment or damaged assets.
- The potential for wider damage, e.g., fire growth spread attributed to combustible materials or construction in proximity, susceptibility of wall and floor surfaces, stock and machinery to water or fluid damage.
- Previous losses or downtime.

Materials

The risk assessment should consider the material or materials being loaded and unloaded, including:

- Material characteristics at the expected tanker temperatures and pressures.
- The physical characteristics if accidentally released at the different atmospheric conditions, e.g. summer compared to winter, etc.
- The physical state, e.g., whether it is a liquid, a gas or a solid.
- Whether it is explosive, flammable, oxidising or toxic.
- Whether it could generate static.
- Whether its transfer is likely to cause erosion or corrosion to the transfer equipment.

Location and Topography

The risk assessment should consider where road tanker vehicles are parked to load or unload, including the:

- Nature of the surface and its porosity.
- Gradient of the surface (the surface should be firm and level).
- Distance of the station from exposed assets including buildings, tanks, and equipment.
- Distance from any pumps or control features.
- Transport systems or pedestrians/individuals in close proximity.
- Drains or sewers.
- Rivers or streams.
- Nature of the surrounding areas, for example, commercial, industrial or natural.

Environmental Conditions

Materials behave completely differently with different atmospheric and environmental conditions. The risk assessment should consider:

- Wind conditions.
- Temperature.
- Rainfall.
- Snow/ice.
- Humidity.

Refer to Aviva Loss Prevention Standard **Material Damage Risk Assessment** for further guidance.

Managing the Risks

Standard operating procedures (SOPs) or site rules, based on the findings of the risk assessment should be formalised and implemented. Measures to consider include, but are not limited to:

Loading/Unloading Area

- Suitability of covering the loading/unloading area and the vehicle with non-combustible wall and ceiling/roof materials.
- Installation of barrier walls around loading and unloading areas, or fire resistance rated walls, where such areas are in close proximity to site buildings.
- The prohibition of smoking and other sources of heat, including hot works, near the loading/unloading operation.
  - ✓ The Aviva Loss Prevention Standard **Hot Work Operations** should be followed where hot works are unavoidable ensuring vehicles have been removed a safe distance, flammable liquids, vapours, etc., have been adequately purged from pipework, and the area appropriately segregated before commencing work from the loading/unloading area.
  - ✓ Thermographic cameras should be used throughout the process and during fire watches.
  - ✓ Fire watches should be undertaken for up to 240 minutes after the hot works, and only reduced where supported by a specific risk assessment.
  - ✓ A minimum fire watch period of 120 minutes should be enforced.
- Implementing robust housekeeping rules and standards, including control of vegetation in proximity, waste management controls, etc.
- Whether loading/unloading exposes other nearby assets and buildings (including via open windows or doors).
- Installation of fire detection and fire protection systems suitable for use with the materials being loaded and unloaded, e.g. sprinkler systems, foam based agents, etc.

Safety Features

- Installation of appropriate process control devices and hardwired interlocks.
- Suitably located emergency manual shutdown buttons, with all necessary safety equipment available at the loading or unloading area.
- Containment for at least 110% of the capacity of the largest tank in a bund or 25% of their total storage capacity, whichever is greater.
- Installation of physical restraints to prevent unauthorised/unplanned vehicle movements.
- The use of temporary barriers to prevent uncontrolled vehicle or personnel movements.
- Clearing overhead obstructions.
- Clear and appropriate signage, with relevant information displayed at each loading or unloading point.
- Sealing or covering of any drain covers.
- Ensuring pipework is correctly specified for the materials and of appropriate length and condition.
- Installation of appropriate earthing and bonding devices for the materials being loaded/unloaded.
  - ✓ Earthing should be checked prior to any tanker loading/unloading activities.

Loading/Unloading Activities

- Verifying loads as correct, e.g., checking delivery notes/orders, etc., and verifying compatibility with any existing materials in holding silos/pens, etc.
- Prohibition of hazardous activities being completed at the same time as loading and unloading operations.
- The approved times for loading and unloading activities and ensuring they are only completed by suitably trained persons.
- The use of appropriately rated devices, equipment, vehicles, clothing and footwear for classified areas (with a flammable or explosive atmosphere).

Management Programmes

- Extending self-inspection programmes to include loading and unloading areas and operations.
  - ✓ At least monthly is recommended in most instances, or after any significant change to the premises, activities, etc.
- Formalising testing and maintenance procedures with records maintained for all items in the process, including the vehicle, earthing and pipework.
- Procedures for reporting faults, issues, damage, etc.
- Auditing of SOP's/site rules for compliance and ongoing suitability/adequacy.

Refer to Aviva Loss Prevention Standards **Self-Inspections, Maintenance Regimes Material Damage Risk Assessment** for further guidance.

Training

All individuals involved in loading and unloading processes must be competent to undertake the roles and responsibilities required of them. Training for operations involving potentially hazardous materials is essential, and should cover:

- ✓ Normal loading/unloading practices.
- ✓ Hazards associated with the substances being loaded or unloaded, controlling drivers, etc.
- ✓ Emergency situations including evacuation procedures, cessation of loading/unloading activities and safe isolation of equipment.
- Ensuring road tanker drivers are:
  - ✓ Appropriately trained for the work undertaken and site safety rules.
  - ✓ Provided with safety instructions for the specific tasks.
  - ✓ Wearing appropriate Personal Protective Equipment (PPE) whilst on site and during the loading or unloading process.

Emergency Response

Appropriate formal emergency response plans should be in place for loading and unloading activities. These should consider what could fail, what could go wrong and how emergency events could escalate. The emergency plans should be practised at least annually and ideally involve the local public resources and any third-party organisations or contractors that are used.

Refer to Aviva Loss Prevention Standard **Emergency Response Teams** for further guidance.

Business Continuity

Every business should have a formal Business Continuity Plan in place. This should be reviewed to ensure disaster recovery and continuity arrangements remain adequate in relation to loading and unloading activities. Any actions generated should be addressed promptly.

Refer to Aviva Loss Prevention Standard **Business Continuity** and **Business Impact Analysis** for further guidance.

Key Actions

- Undertake a thorough risk assessment to identifying loading and unloading hazards and exposures.
- Implement appropriate control measures and SOPs/site rules to help manage the risks associated with loading and unloading operations.
- Ensure all workers are appropriately trained on SOP's/site rules including emergency planning and reporting of faults, damage, etc.
- Carry out regular self-inspections. At least monthly is recommended.
- Formalise testing and maintenance arrangements.
- Routinely audit inspection and maintenance records for adequacy and ongoing improvement.

Checklist

A generic **Road Tanker Loading and Unloading** Checklist is presented in Appendix 1 which can be tailored to your own organisation.

Specialist Partner Solutions

Aviva Risk Management Solutions can offer access to a wide range of risk management products and services at preferential rates via our network of Specialist Partners.

- Inspection, audit, risk assessment software platform - **Safetyculture**
- Business Continuity - **Horizonscan**

For more information please visit:Aviva Risk Management Solutions – Specialist Partners

Sources and Useful Links

- HSG176: Storage of flammable liquids in tanks – Health and Safety Executive (HSE)
- L122: Unloading petrol from road tankers: Approved Code of Practice and Guidance – HSE

Note: Whilst UK standards and legislation are referenced in this document, other international standards and legislation should be referenced where applicable.

Additional Information

Relevant Aviva Loss Prevention Standards include:

- **Material Damage Risk Assessment**
- **Self-Inspections**
- **Maintenance Regimes**
- **Hot Work Operations**
- **Emergency Response Teams**
- **Assessment of Pollution Risks**
- **Business Continuity**
- **Business Impact Analysis**

To find out more, please visit Aviva Risk Management Solutions **or speak to one of our advisors.**

Email us at riskadvice@aviva.com or call 0345 366 6666.*

*The cost of calls to 03 prefixed numbers are charged at national call rates (charges may vary dependent on your network provider) and are usually included in inclusive minute plans from landlines and mobiles. For our joint protection telephone calls may be recorded and/or monitored.

Appendix 1 – Road Tanker Loading and Unloading Checklist

Location	
Date	
Completed by (name and signature)	

	Road Tanker Loading and Unloading	Y/N	Comments
1.	Have specific hazard and activity risk assessments been completed and are these regularly reviewed?		
2.	Are the physical characteristics of the material or materials involved fully understood? • At the expected temperature and pressures within the tanker or storage vessels? • If it were released at expected worst and best-case atmospheric conditions? • Is it a liquid, gas or solid? • Is it explosive, flammable or toxic? • Does it create static? • Is it likely to cause erosion or corrosion to the transfer network? • Is it water miscible? • If a gas or a vapour is generated, is it heavier than air?		
3.	• If multiple different materials are loaded or unloaded from the same station, are any materials reactive or incompatible with each other? • Are appropriate precautions taken to minimise the materials from interacting?		
4.	When considering the nature of the material and the location of the activity, do the risk assessments include the maximum and minimum expected: • Wind conditions? • Ambient temperature? • Rain fall? • Snow or ice? • Humidity?		

	Road Tanker Loading and Unloading Contd.	Y/N	Comments
5.	Does the nature of the tanker loading and unloading station increase the risk posed, due to: • Nature of the surface and its porosity? • Gradient of the surface? • Distance from exposed assets including buildings, tanks, and equipment? • Distance from any pumps or control features associated with the activity itself? • Other transport passing by or in close proximity? • Being in a roadway? • Other loading and unloading stations? • Drains or similar nearby? • Rivers or streams nearby? • Nature of the surrounding areas? • Any overhead obstructions?		
6.	Does the activity expose assets and/or buildings, including: • Open windows or doors? • Ventilation air intake vents?		
7.	Are there appropriate process controls and hardwired interlocks?		
8.	• Have emergency manual shutdown buttons been located in two readily accessible and safe locations? • Are alarms or warning indicators clearly labelled and regularly checked?		
9.	In respect of liquids, has containment been provided for at least 110% of the capacity of the largest container or 25% of their total storage capacity, whichever is the greater?		
10.	Do barrier walls or fire compartment walls need to be provided around the activity, or between it and any exposures?		
11.	Aside from any interlocks on the vehicle, are physical restraints used to prevent vehicle movement?		
12.	• Are connecting hoses or piping of appropriate type, length and condition, and are these formally inspected and maintained? • Are couplings, hoses and seals regularly examined to ensure compatibility, and to check for the presence of dirt before connection?		

	Road Tanker Loading and Unloading Contd.	Y/N	Comments
13.	If multiple materials are transferred, are separate hoses for each material used, and are they easily identifiable and labelled?		
14.	Are earthing and bonding straps provided? • Are these interlocked to prevent material transfer? • Are there earth continuity indicator lights? • Is this formally inspected, tested and maintained?		
15.	• Are activities always completed by trained site operators and road tanker drivers? • Are all road tanker drivers provided with site induction training?		
16.	Are formal recorded inspection, testing and maintenance activities completed for all items in the process, including the vehicle?		
17.	• If the area is classified, are appropriately rated devices, equipment, vehicles, clothing and footwear used? • Is this monitored and audited?		
18.	Are temporary barriers used to prevent vehicle or personnel movements?		
19.	Is there clear and appropriate signage throughout the site and at the loading and unloading points?		
20.	• If there is the potential for materials to enter drains, are appropriate covers used? • Are these sufficient for an emergency release?		
21.	Is there appropriate lighting, including emergency lighting?		
22.	Are other activities prevented from being completed at the same time as these operations, such as: • Hot work or other permit-related activities? • Vehicles driving past? • Other loading or unloading if there are adjacent stations? **Note:** This may be critical if such work involves incompatible or reactive materials.		
23.	• Are housekeeping, vegetation growth and waste control maintained to the highest standards? • Is this all maintained away from loading and unloading activity?		

	Road Tanker Loading and Unloading Contd.	Y/N	Comments
24.	Are housekeeping, vegetation growth and waste control maintained to the highest standards? Is this all maintained away from loading and unloading activity?		
25.	Are there formal training programmes in place covering: • Normal loading and unloading activities? • Emergency procedures and response? • Does this include drivers and other visitors?		
26.	Has appropriate volatile organic content detection been provided for any organic liquids or gases handled?		
27.	Has appropriate toxic material detection been provided?		
28.	If more than one material is transferred, have all physical characteristics been considered for the detection systems?		
29.	Is appropriate automatic fire detection provided?		
30.	Where any detection is installed, have interlocks been provided to safely and automatically shut down material transfers?		
31.	If there is concern for gas or vapour escape, have automatically and/or manually activated water curtains or water sprays been provided to knock down or absorb such materials?		
32.	• Have automatically actuated sprinkler or deluge systems been provided to extinguish any potential fires, including materials and vehicles? • If so, have these been approved for use with the materials being loaded and unloaded?		
33.	Has exposure protection been provided for any other assets or buildings nearby?		
34.	If there is potential for a release, or a pool fire within a contained area, has appropriate foam or foam blanketing been provided?		
35.	• Are there appropriate fire hydrants in the area, with at least two located in opposite directions? • Is the available water supply known and considered acceptable?		

	Road Tanker Loading and Unloading Contd.	Y/N	Comments
36.	• Are formal emergency response plans in place? • If so, do these consider: ✓ What could fail? ✓ What could go wrong? ✓ How could the emergency escalate?		
37.	Are emergency plans practised at least annually?		
38.	Do emergency plans involve: • Local public resources? • Any contractors or third-party delivery organisations?		
39.	Additional comments:		

Please Note

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